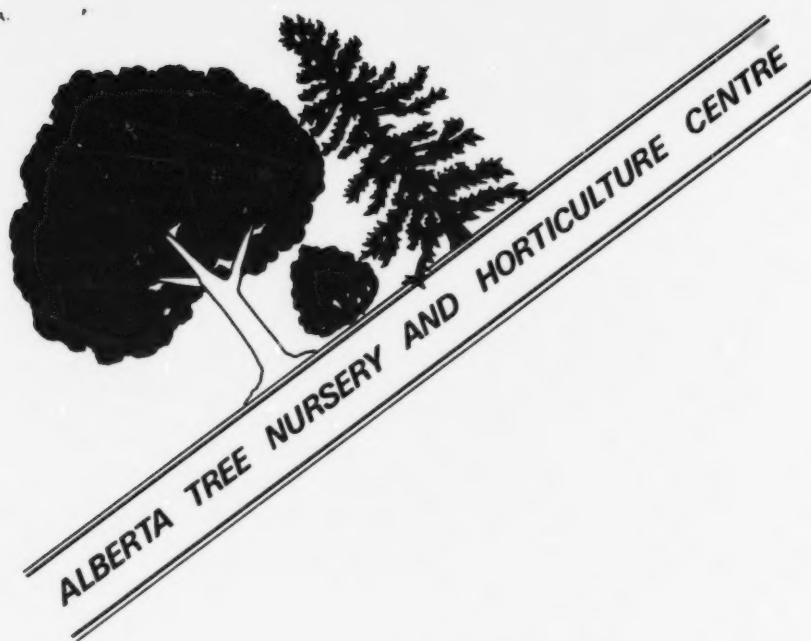




PROPAGATION OF SASKATOONS

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The selecting of saskatoons (Amelanchier alnifolia) was started in 1918 by Dr. W. D. Albright. The work was carried on through to 1952 when Smokey and Pembina were released from Beaverlodge ⁽¹⁾.

The saskatoon has considerable potential as a commercial crop since it can be readily cultivated and is suited to mechanically harvesting in a once over operation. There appears to be a market for the fruit.

There are problems which some production methods. Seedlings rarely are true to type (a variation of up to 25% is noted) and grafted stock shows a high percentage of union incompatibility. Not much literature on compatibility is available on Amelanchier alnifolia but Halward and Wallace have had success with Crataegus and Sorbus and Wallace reported the use of Malus. Related species have been tested as reported by White and Mahlstedt for Aronia, Cotoneaster, Malus and Pyrus. Reports of incompatibility with related species on Crataegus crus-galli are noted. Difficulties with Amelanchier canadensis on Cotoneaster acutifolia are reported by White and Mahlstedt. Prairie nurserymen have had acceptable results with cultivars of Amelanchier alnifolia on Cotoneaster acutifolia.

In order to produce a high quality plant that is of a selected type vegetative propagation appears to be the only viable alternative to seeds.

With a 10 acre experimental orchard establishment for the Peace Country of Alberta by the Peace Country Small Fruit Growers Society (P.C.S.F.G.S.) formed in 1973, ⁽²⁾ a large number of good sized plants were required in a short period of time

(less than 2 years). We undertook to produce the require volume of Smokey stock for this co-operative project.

During this first growing process from seed the first indications of a problem emerged. That was a dormancy factor. Under ideal greenhouse growing conditions the initial seedling crop went into a dormany cycle three times (from late January to early June). A large number stayed dormant all of the following summer. In order to maintain the number of plants softwood cuttings were taken from those determined to be closer to the Smokey selection.

The cuttings rooted very well with a heavy root mass, however, as others have indicated the plants went dormant. They fail to survive the first winter due to the lack of an active root system.

Harris indicated the softwood cuttings rooted readily.⁽¹⁾ He also indicated a need to research ways of keeping the plants growing to develop a root system that would enable the plants to overwinter successfully.

Seed propagation in outdoor beds has no particular problems if fall sown after a 30 - 60 day sand vernalization process. Seeding of mascerated fruit has been inconsistant here.

Vegetative Propagation: 1979 Study

On a greenhouse propagation bench equipped with a bottom heat filament (covered lead element) and an overhead misting system, the medium was lowered to allow us to place the bottom of the cuttings 5 to 7 cm from the heat filament. One half inch of the stem was dipped into IBA and stuck in the medium (2 parts peat moss, 2 parts sand and 1 part vermiculite.) A frame was constructed over the propagation bench and clear plastic was

draped over it to fully enclose the bench and the misting system.

The terminal stem cuttings were approximately 10 to 12 cm long taken from the new growth of containerized seedlings growing in the greenhouse. Two hundred were planted on each side of the bench on February 1, 1979.

The thermostat controlling the bottom heat filament was set at 35°C in order to maintain the temperature of the rooting medium at 25°C in the vicinity of the end of the cutting. The misting system was set on February 1 to spray for 22 seconds every 1/2 hour between 10:00 a.m. and 4:00 p.m. and 22 seconds every 2 hours between 4:00 p.m. and 10:00 a.m.

The greenhouse was fumigated with Parathion on February 5, 9, 20 and 24 to control greenhouse pests. The ends of the plastic tent were lifted to allow fumigant on those dates although no insects were evident on the saskatoons.

On April 2, the cuttings which had rooted with a heavy root mass were potted and left in the greenhouse for further observations. Records of successful and non-successful cuttings were kept. (See Table I).

Rooting Performance of Saskatoon

Roots were first noticed on Saskatoon on February 15. Although there were roots up to 2 cm long, most of the plants sampled had a very light root mass. Many plants had a heavy root mass by the last week of February.

Those cuttings rooted successfully during February and March went into a dormant state, losing the foliage and setting a bud. When the cuttings were potted up, they were exposed to different conditions to break the plant dormancy. Each test

method was replicated, what follows is a condensation of the treatments and the results obtained.

DORMANCY TREATMENTS 1979

Method I - Cooling Treatment

At the beginning of June 1979, 150 dormant saskatoons in 1 gallon pots and 60 dormant saskatoons in 4 inch pots were put into a walk-in cooler (at temperatures of 0°C to +2°C) for 1, 3 and 6 months. At the end of each time period, 50 - 1 gallon pots and 20 - 4" pots were placed into Greenhouse #11. At the end of the 1 month period 25 of the 50 - 1 gallon pots were shaded to allow 6 hours of light each day with increased lighting of 1 hour each week. The stock potted in 1 gallon pots were grown from seed while those in the 4" pots were rooted cuttings. The results are shown in Table II.

Method II - Ether Treatment

On July 27, 1979, 12 dormant saskatoons in 1 gallon pots were placed under a plastic enclosure along with two shallow saucers containing ether for 5, 10 and 15 minutes. At the end of each time period 4 pots were removed and put into the lathhouse.

On August 9, 1979 the trial was repeated with the time period changed to 7, 10 and 12 minutes using 10 pots for each time period and 10 pots were left as control.

On September 7, all the pots were moved into the greenhouse so that the cooler fall temperatures would not inhibit dormancy breaking.

RESULTS

On the first treatments flushing was first noticed on pots with 5 and 10 minute periods of exposure after 6 days. After 17 days the 15 minute treatment began flushing.

The results of the ether trial suggest that ether fumes have little effect on dormancy breaking as the control pots were first to flush in the second test. Those subjected to ether the first time may have broken dormancy without the treatment.

Method III - Shading

Starting on December 27, 1979, (each day from 4:00 p.m. to 8:30 a.m.) 12 potted saskatoon plants were placed under a black plastic shade in the greenhouse. This treatment was carried on for three months until March 28, 1980.

RESULTS

Since neither visual observation nor oscilloscope readings showed any difference between shaded and unshaded saskatoon plants. This method was discontinued as of March 28, 1980.

Method IV - G.A. Drench

At the start of November, 1979 a total of 1,000 softwood cuttings were taken from actively growing potted saskatoons located in a greenhouse. These were treated with a rooting hormone and planted immediately into a propagation bench equipped with (a) a bottom heat filament to control soil temperatures at 25°C, (b) an overhead misting system programmed to spray for 22 seconds every two hours during the daytime, and (c) plastic tent to retain humidity.

After two weeks (by the middle of November,) a heavy root mass was noted on these cuttings and between November 13 to 20

nearly all 1,000 were potted into 4" pots, using a media mix of 1-1-1 (peat - sand - vermiculite).

The rooting period for these saskatoon cuttings was 13 - 20 days.

The pots were visually checked for dormancy and a sample tested weekly using the oscilloscope.

On February 19, 1980, a total of 123 potted dormant plants were treated with the following tests:

TEST I - COLD/WARM TREATMENTS

1. 24 plants were subjected to 1 and 3 months of (a) cold (0-2°C), (b) warm (+24-30°C).
2. 12 plants were subjected to 1 month warm then 1 month cold.

TEST II - GIBBERELIC ACID ($C_{19}H_{22}O_6$ - 80% minimum reagent)

1. 36 plants were treated with a drench solution of gibberellic acid applied at 25%, 35% and 45% @ 1.0 ml/pot - 1/2 (18 plants) were subjected to the cold treatment for 1 month.
2. 6 plants were treated with a drench solution of gibberellic acid applied at 45% @ 3.0 ml/pot.

TEST III - ETHER GAS (96% - 99% pure alcohol/water base)

1. 36 plants were exposed to ether fumes for 7, 10 and 12 minutes 1/2 (18 plants) were subjected to the cold treatment for 1 month.

2. 9 plants were kept as control.

COMMENTS ON RESULTS: (Table III)

1. Those plants which received gibberellic acid as part of their treatment broke dormancy earlier than the control.
2. In the course of this trial, only those plants treated with gibberellic acid reached the fourth stage of budbreak i.e. the leaf is completely open.
3. One week after the gibberellic acid was applied to the plants, dormancy was broken (this is true in all cases when gibberellic acid was a part of the treatment).
4. Those plants which were subjected to the 'cold treatment' (Test #1) had the most difficulty breaking dormancy, although the length of time spent in the cooler (i.e. one or three months) does not appear significant in shortening the length of time to flush.
5. The 'warm' treatment (Test #2) decreased the amount of time required to break dormancy only slightly (by three weeks) in the plants which were in the bed for three months. Those plants which were in the heated bed for only one month were no different than the control plants.
6. The ether treatment produced no significant decreases in time required to break dormancy except in treatment #6 when the plants were exposed to ether gas for 7 minutes. Other exposures in treatment #6 and all those in treatment #7 did not alter the time required to break dormancy.

7. The following observations can be made concerning the plants in the tests:
- i the plants treated with gibberellic acid were considerably taller than all others (with confidence),
 - ii of those plants treated with gibberellic acid, those plants receiving the strongest concentrations (i.e. 45% O.S.) grew significantly taller, with a definite columnar habit.
 - iii in all remaining treatments, the average heights of the plants are lower than that of the control.

NOTE:

In all cases, except those where gibberellic acid was applied, there was very little growth, this applies to the control as well. The fact that plants which received some sort of treatment are smaller than the control is most likely chance and does not indicate that growth has in some way been stunted by these treatments.

CONCLUSION

1. Gibberellic acid aids the Saskatoon cuttings to break dormancy.
2. The stronger the concentration of gibberellic acid applied to this plant the quicker the 'bud-breaking' process will take place and the sooner the trees will begin to grow.
3. If, for any reason, dormancy should want to be maintained, the continuing of the 'cold treatment' would be the most effective.
4. Dormancy was broken immediately after gibberellic acid was added to plants which were removed from the cooler (Treatment #5), the cold aids the effect of the acid in more even bud break, ie. the buds all broke in a matter of 3 days.

From Table IV it is apparent that subjecting dormant saskatoon to temperatures of 0° to +2°C for 1, 3 or 6 months will cause active growth when removed and placed into a growing environment. Saskatoons subjected to longer periods of cold temperatures seem to start growth more rapidly than those whose cold periods are shorter.

Method V - G.A. vs IBA Drench

Two trials were established in the winter of 1980/81 to investigate the use of 3-indolebutyric acid (IBA) as a substitute for gibberellic acid (GA) in breaking the dormancy of saskatoon plants. The cost of applying GA is high and could only be effective for very large numbers of plants.

At the start of December, 1980, a total of 1,400 softwood cuttings were taken from actively growing potted saskatoons located in a greenhouse. These were treated with a rooting hormone and planted immediately into a propagation bench equipped with (a) a bottom heat filament to control soil temperatures at 24°C, (b) an overhead misting system programmed to spray for 22 second every two hours during the daytime, and (c) plastic tent to retain humidity.

After two weeks (by the middle of December 1980) root development was noted on these cuttings and between January 8 to 12 over 1,000 were potted into 4" pots, using a media mix of 1-1-1 (peat - sand - vermiculite). The rooting period for these saskatoon cuttings was 9 - 16 days.

The potted saskatoons were visually checked and all dormant plants were set aside for the investigation.

On May 20, 1981, a total of 600 potted dormant plants were treated with the two different acids:

1. 300 plants were subjected to a drench solution of GA in varying concentrations.
2. 300 plants were subjected to a drench solution of IBA in varying concentrations.
3. 100 control plants.

The results of these treatments can be found in Table V. A number of plants were treated with the acid drenches and then subjected to cooler temperatures for 1 month.

DISCUSSION:

The treatment GA root drench is effective in breaking the dormancy. The higher concentration of GA speeds the process of bud break. As may be expected the IBA drench has no effect on breaking dormancy.

As indicated in earlier saskatoon work the rooting dormancy can be overcome by chilling the plants for a minimum of 30 days.

The IBA drenched material and an additional group of GA stock were chilled for 1 month. Table VI shows the results of that treatment.

DISCUSSION OF RESULTS

The cold treatments were not significantly different for the IBA/cold stock nor GA/cold treated. It is doubtful if the IBA or GA had any effect on the stock after the length of elapsed time between applications and cold treatment.

Method VI - Softwood Collections Out of Doors

This trial was established in the spring of 1981 to determine the rooting performance of saskatoon cuttings collected from the saskatoon plantation.

On June 5, 1981 a total of 240 saskatoon cuttings (40 of each of the six varieties) were treated with rooting hormone and were planted immediately in the propagation bench which was equipped with a bottom heat filament. Plastic tent enclosed the bench to retain humidity. Soil temperatures were kept constant at 24°C. The rooting performance results after six weeks is as follows:

VARIETIES	MEDIUM	ROOTING %	ROOTING TIME
1. Thiessen	2-3-1	23%	19 days
2. Smokey	2-3-1	18%	18 days
3. Pembina	2-3-1	8%	19 days
4. Honeywood	2-3-1	0%	-----
5. Moon Lake	2-3-1	0%	-----
6. Northline	2-3-1	0%	-----

Note: 2-3-1 (Peat-Sand-Vermiculite) was the rooting medium.

Since these saskatoon cuttings showed deterioration and no additional rootings occurred six weeks after planting, the trial ended on July 17, 1981.

DISCUSSION OF RESULTS:

The taking of softwood cuttings from field grown plants must be monitored very closely to ensure viable material for rooting. If possible etiolated material should be used.

The ability to control the mother stock production of softwood cuttings aids in the number of successful root initiations. It is important then to keep the mother plants in a greenhouse or heated frame to facilitate early and succulent growth.

Method VII - Saskatoon Root Cuttings

To propagate saskatoon plants from established stock by root cuttings.

1. Roots of each variety were cut with at least two nodes on each root segment.
2. These were then potted in 1 gallon plastic pots and placed in the greenhouse under the bench, kept moist with 4 or 5 root segments planted per pot. Each variety averaged between 90 - 100 root segments except Pembina which had only 25 root segments.
3. 15/5/81 - the pots were transferred to the lathehouse where rooting was observed. First sprouting was observed 11 days after planting (May 5, 1981).

DISCUSSION OF RESULTS

1. Propagation of saskatoon from root cuttings showed varying success rate, but was not better than 50%. (Table VII) Of the 25 clones involved 2360 root cuttings were taken. The success of rooting is determined by a clonal effect. In other words each selected clone has a definite rootability.
2. Softwood cuttings taken from these selections show the same clonal variation in marked differences in rooting success.

Method VIII - Hardwood Saskatoon Cuttings

To exhaust the propagation process the possibility that the species (Am. alnifolia) can be propagated by hardwood cuttings was undertaken. This test was carried out during late 1980 to 1981.

Harris, R., 1973, summary report, "hardwood cuttings are extremely difficult to root". Casement, E.B., 1976, Outline of Saskatoon Rooting Trials, "there is no problem".

OBSERVATIONS

DATE	GREENHOUSE #11 TEMP.	LIGHTS
December 10 - 31	27° - 24°C	20 hours
January	21° - 16°C	18 hours
February	21° - 16°C	18 hours
March 1 - 10	21° - 16°C	18 hours
March 11	21° - 16°C	16 hours

In all 3 phases treated cuttings and control showed deterioration (mold) and no rooting throughout the observation period. Therefore Phase I was cancelled March 2, 1981 after 6 weeks. Phase II was cancelled April 1, 1981 after 1 month, and Phase III was cancelled on July 8, 1981 after 5 weeks.

Phase IV - one year wood hardwood cuttings began to mold extensively. Since these cuttings failed to root, the first phase was cancelled May 15, 1981 due to mold, followed by cancellation of the second phase August 10, 1981.

DISCUSSION OF RESULTS

Since none of the hardwood cuttings showed signs of callousing nor rooting it was concluded that hardwood cuttings, taken in the fall and treated through storage, wounding and hormone application do not form roots under greenhouse or other conditions here.

PROPAGATION OF SASKATOONS - DISCUSSION

Seed propagation is the least expensive and surest way of propagation only if trueness to type is not important. Variability of 25% or more is not acceptable for mechanical orcharding. When selecting for improved qualities, asexual propagation becomes imperative. We consistently attain 70 - 95% germination of outdoor fall seeding. There is an indication that there may be an increased seed dormancy if the seed is improperly handled or stored.

Grafting selected Saskatoons onto some rootstock varieties have shown to have some incompatibilities in later plantings. The control of sucker growth may be a disadvantage with some types or rootstocks.

Our work here has centered on the dormancy condition which prevents the establishment of an adequate root system on rooted cuttings. A successful alternative to seed and grafting is a softwood cutting method.

Placing the potted rooted cutting into a cooling unit has shown to stimulate growth. The temperature must be rigidly controlled and not be allowed to fall below freezing. There is evidence to show that the root system must be protected from freezing temperatures. Cooling the stem and buds maybe impractical when considering large volumes of plants. This is

a costly method in time and capital needed for the cooler. It may be practical for smaller numbers where a simple cooling unit is available. Three months of cooling produces higher bud activity.

Gibberelic Acid is shown to be very effective in breaking the plants dormancy even at the lowest concentrations. The length of time required is increased at the lower concentration but the cost is lessened. The cost of a Gibberelic Acid drench is expensive and can only be effective on large volumes of plants. After three years of growth there is no detrimental effects after applying G.A. The upright growth habit found on initial application is lost and the normal growth habit is assumed. Only acceptable winter losses have been experienced in subsequent overwintering of the treated plants.

IBA does not appear to be effective in bud breaking. This is not surprising when one considers its active sights within the plant.

Root segments offer an alternate method depending upon time, facilities and clone. This method does injure the plant to a greater extent than softwood cuttings.

Hardwood cuttings seem to be of no value when taken under the eleven combinations used here. Vacuum was not used and may have resulted in complete and rapid root initiation of the cuttings prepared.

1. Harris, R. E. 1971, Saskatoons. Summary Report
2. Collin, G.H. 1976, Progress Report on Alberta's Native Fruit Pilot Project.

TABLE 1: CUTTINGS ROOTED APRIL 2, 1979

SPECIES	MEDIA	R O O T E D						N O T R O O T E D							
		HEAVY MASS		LOW MASS		TOTAL		DEAD		ALIVE NO-CALLUS		ALIVE CALLUS		TOTAL	
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
AMELANCHIER ALNIFOLIA	5-7 cm from heat source	58	29	43	21.5	101	50.5	4	2	23	11.5	72	36	99	49.5
	12-20 cm from heat source	83	41.5	39	19.5	122	16	6	3	12	6	60	30	78	39

NOTE:

- Heavy Mass and Low Mass refers to root mass which was judged by number of roots, secondary roots and branching roots - assessed visually.
- Under 'Not Rooted', plants were determined dead or alive through appearance.

TABLE II: RESULTS OF DORMANT SASKATOONS IN A COOLER AT 0°C - +2°C

PERIOD IN COOLER	POT SIZE	FLUSHING BEGAN	FLUSHING COMPLETE	PLANT A*	PERFORMANCE B**
1 Month	1 gal. shaded	20 days	26 days	24	1
	1 gal. unshaded	20 days	26 days	25	1
	4" rooted cuttings	27 days	35 days	14	6
3 Months	1 gal.	7 days	16 days	48	2
	4" rooted cuttings	14 days	21 days	13	7
6 Months	1 gal.	5 days	9 days	46	4
	4" rooted cuttings	7 days	9 days	9	12

NOTE: *A - Number of plants breaking dormancy.

**B - Number of plants not breaking dormancy.

TABLE III

MONITORING OF SASKATOON SOFTWOOD CUTTINGS
(3 month period)

TREATMENT			W E E K														FLUSHED #	%	AVE NEW GROWTH	NO. TREATED (cm)
			1	2	3	4	5	6	7	8	9	10	11	12	13	14				
1. COLD	1 mo.		D	D	D	D	D	D	D	B4	B4	B4	B4	B4	B4	2	2	33	0.75	6
	3 mo.		D	D	D	D	D	D	D	D	D	D	D	D	D	D	0	0	----	6
2. WARM	1 mo.		D	D	B1	B2	B4	B4	B4	B4	B4	B4	B4	B4	B4	2	2	33	0.5	6
	3 mo.		D	D	D	D	D	D	D	D	D	D	D	D	D	D	0	0	----	6
3. COMBINATION	Warm		D	D	D	D	D													
	Cold							D	D	D	D	D	D	B4	B4	4	4	33	1.0	12
4. G.A. - 1 ml	a) 25% DS		D	B1	B2	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	6	6	100	6.9	6
	b) 35%		D	B1	B3	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	5	5	83	11.9	6
	c) 45%		D	B2	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	6	6	100	16.0	6
5. COMBINATION G.A./COLD	a) 25%		D	D	D	D	D	D	D	B3	B4	B4	B4	B4	B4	6	6	100	10.9	6
	b) 35%		D	D	D	D	D	D	B1	B2	B4	B4	B4	B4	B4	6	6	100	11.6	6
	c) 45%		D	D	D	D	D	D	B1	B2	B4	B4	B4	B4	B4	6	6	100	15.6	6
6. G.A. 3 ml. 45%		D	B2	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	B4	6	6	100	18.0	6
7. ETHER - 7 min.		D	D	D	D	D	D	D	D	D	D	D	D	D	D		0	0	----	6
	10 min.		D	D	D	D	D	D	D	D	D	D	D	D	D		0	0	----	6
	12 min.		D	D	D	D	D	D	D	D	D	D	B2	B4	B4	1	1	17	----	6
8. ETHER/COLD	7 min.		D	D	D	D	D	D	D	D	D	D	D	D	D		0	0	----	6
	10 min.		D	D	D	D	D	D	D	D	D	D	D	D	D		0	0	----	6
	12 min.		D	D	D	D	D	D	D	D	D	B3	B4	B4	B4	2	2	33	0.7	6
CONTROL			D	D	D	D	D	D	D	D	D	D	D	D	D		0	0	----	9

NOTES: D = Dormant B = Budbreak Mo = Month Min. = Minutes DS = Drench Solution

B1 = Bud break - Just beginning to break

B2 = Budbreak leaf beginning to shape

B3 = Budbreak leaf developed but not open

B4 = Budbreak leaf open

TABLE IV

FLUSHING PERFORMANCE OF DORMANT SASKATOON CUTTINGS AFTER TREATMENT

(as of July 18, 1980)

TREATMENT	NUMBER TREATED	DATE OF TREATMENT	FLUSHING DATE	TIME OF FLUSHING (days)	% FLUSHED	AMOUNT OF GROWTH (cm)
I. 1. Cold 1 mo.*	6	19/2 - 19/3/80	9/4/80	21	33%	0.5
3 mo.	6	19/2 - 21/5/80	28/5/80	7	100%	1.6
2. Warm 1 mo.	6	19/2 - 19/3/80	5/3/80	15	33%	0.7
3 mo.	6	19/2 - 21/5/80				
3. Combination Warm/Cold	12	19/2 - 19/3/80 (warm)				
		19/3 - 22/4/80 (cold)	7/5/80	15	67%	1.0
II. 4. G.A. - 1 ml 25%+	6	19/2/80	5/3/80	15	100%	8.6
35%	6	19/2/80	5/3/80	15	100%	8.4
45%	6	19/2/80	5/3/80	15	100%	16.6
5. Combination 25%	6	19/2 - 19/3/80	9/4/80	21	100%	12.1
G.A./Cold 35%	6	19/2 - 19/3/80	2/4/80	14	100%	15.7
45%	6	19/2 - 19/3/80	2/4/80	14	100%	17.7
6. G.A. - 3ml 45%	6	19/2/80	27/2/80	8	100%	18.7
III. 7. Ether 7 ml.*	6	19/2/80				
10 ml.	6	19/2/80				
12 ml.	6	19/2/80	30/4/80	69	17%	0.2
8. Combination 7 ml.	6	19/2 - 19/3/80	3/7/80	49	17%	0.2
Ether/Cold 10 ml.	6	19/2 - 19/3/80				
12 ml.	6	19/2 - 19/3/80	22/4/80	34	67%	0.7
9. Control	9				0%	nil

NOTE: Monitoring of these cuttings was done over a 5 month period.

* mo. = Month

+ = Drench Solution

mi. = minutes

TABLE V

MONITORING OF SASKATOON SOFTWOOD CUTTINGS
(Two Months Observations - As of July 27, 1981)

NO.	TREATMENT	START 20/5/81	NO. TREATED	AVE. HEIGHT	% FLUSHED BY WEEK								TIME OF FLUSHING
					#2	#3	#4	#5	#6	#7	#8		
I. (A) Gibberellic Acid													
1.	*2.5%	D ⁺	50	8.3	12%	18%	18%	18%	18%	18%	18%	18%	9 days
2.	5%	D	50	6.8	18%	40%	40%	44%	46%	46%	52%	52%	9 days
3.	10%	D	50	7.1	23%	56%	56%	56%	56%	56%	66%	66%	10 days
4.	20%	D	50	7.2	44%	64%	68%	68%	72%	78%	78%	78%	9 days
5.	25%	D	50	7.0	32%	62%	72%	72%	74%	80%	80%	80%	9 days
6.	35%	D	50	6.8	42%	64%	64%	64%	68%	72%	82%	82%	8 days
	Control	D	50 ^x	7.0									
II. (B) Indolebutyric Acid													
1.	5%	D	50	7.5									
2.	10%	D	50	7.7									
3.	15%	D	50	8.6									
4.	20%	D	50	8.8									
5.	25%	D	50	8.6									
6.	35%	D	50	8.4									
	Control	D	50 ^x	6.8									

* Drench Solution

^x No Treatment AppliedD⁺ - Dormant Potted Stock

No plants showed any signs of
dormancy breaking during the
summer.

TABLE VI

MONITORING OF COLD TREATED SASKATOONS SOFTWOOD CUTTINGS AS OF APRIL 8, 1982
(2 months observation)

TREATMENT				AVERAGE HEIGHT (cm)	PERCENTAGE FLUSHED AFTER COLD TREATMENT						TIME OF FLUSHING (days)
ACIDS		COLD	(per week)								
		8.1.82									
20.5.81		8.2.82									
I.	GA: ¹										
1.	2.5%	D ³	22	7.94	50	64	64	77	77	77	22
2.	5%	D	22	6.88	68	82	86	91	95	100	18
3.	10%	D	23	7.08	87	87	96	96	96	96	18
4.	20%	D	21	9.27	57	71	76	90	100	100	18
5.	25%	D	21	8.17	86	100	100	100	100	100	22
6.	35%	D	23	9.25	61	74	78	96	96	96	18
	CONTROL ^x	D	24	6.31	42	50	62	67	67	67	22
II.	IBA: ²										
1.	5%	D	24	7.37	87	96	96	100	100	100	16
2.	10%	D	24	7.84	67	67	67	75	92	92	18
3.	15%	D	24	8.90	42	58	58	83	92	96	22
4.	20%	D	24	9.27	87	87	87	92	96	100	18
5.	25%	D	24	8.61	96	96	96	100	100	100	18
6.	35%	D	24	8.09	92	92	92	92	96	96	18
	CONTROL ^x	D	23	6.76	65	74	74	74	74	78	18

NOTE: 1. GA = Gibberellic Acid
 2. IBA = Indolebutyric Acid
 3. D = Dormant Potted Stock
 4. W = Week

x = No Treatment
 Cuttings Taken: December 3, 1980
 Cuttings Potted: January 10, 1981

TABLE VII

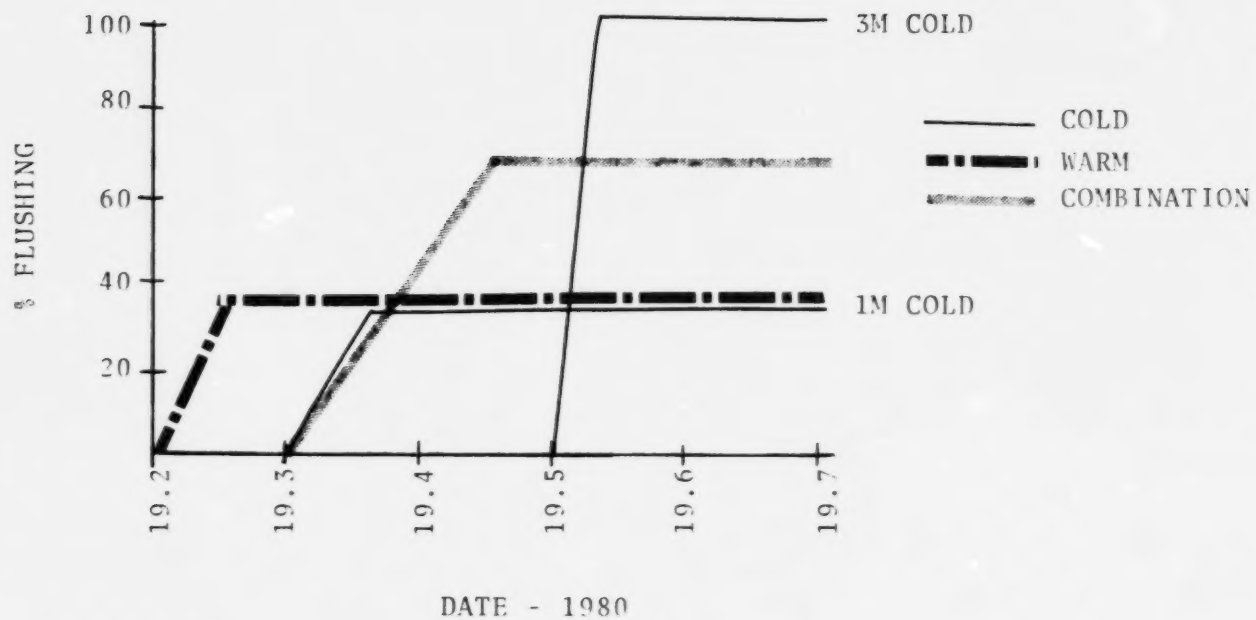
ROOTING PERFORMANCE OF SASKATOON ROOT SEGMENTS AFTER FIVE MONTH PERIOD

(as of October 14, 1981)

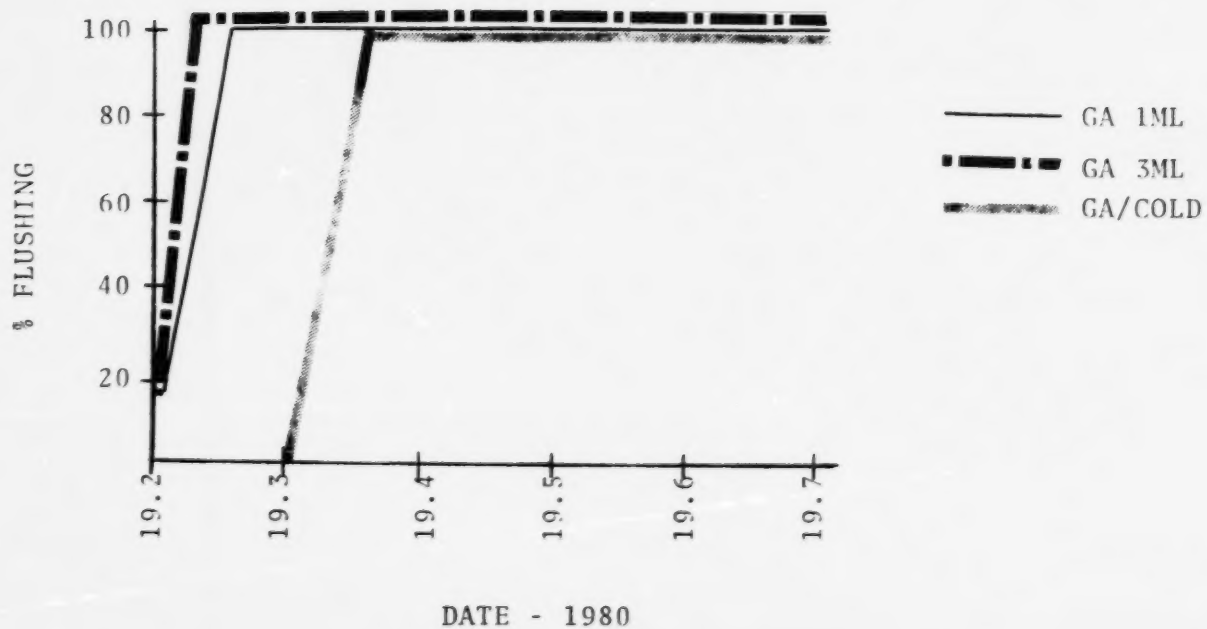
NO.	NO. OF SEGMENTS PLANTED IN EACH POT	R O O T E D	
		NO.	%
1.	90	33	37
2.	90	9	10
3.	100	6	6
4.	90	34	38
4B.	100	0	0
5.	90	39	43
6.	100	7	7
7.	100	21	21
8.	100	0	0
9.	100	14	14
10.	95	0	0
11.	100	9	9
12.	90	8	9
13.	100	1	1
14.	100	1	1
14B.	90	0	0
15.	100	22	22
16.	100	25	25
17.	100	0	0
18.	100	11	11
19.	100	35	35
20.	100	50	50
21.	100	22	22
22.	100	0	0
23.	25	6	24
TOTAL		353	15

% FLUSHING VS TIME

METHOD I



METHOD II



METHOD III

